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(21) International Application Number: PCT/IT99/00301 (22) International Filing Date: 24 September 1999 (24.09.99) (30) Priority Data: MI98A002062 24 September 1998 (24.09.98) IT (71) Applicant (for all designated States except US): I.G.R. S.A. [CH/CH]; Via Alle Vigne, 6, CH-6963 Pregassona (CH). (72) Inventor; and (75) Inventor/Applicant (for US only): MIGLIAVACCA, Rodolfo [IT/IT]; Via Zante, 15, I-20138 Milano (IT). (74) Agent: CICOGNA, Franco; Ufficio Internazionale Brevetti Dott. Prof. Franco Cicogna, Via Visconti di Modrone, 14/A, I-20122 Milano (IT).		(81) Designated States: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG). Published <i>With international search report.</i> <i>Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i> <i>In English translation (filed in Italian).</i>
(54) Title: METHOD FOR MAKING SOY EXTRACTS (57) Abstract <p>The invention relates to a method for making soya extracts, which method is carried out by subjecting the soya seeds to the following method steps: hulling the seeds; softening the hulled seeds in water, boiling and crushing said seeds, centrifuging the seed "mass" to separate a filtrate and solid panel therefrom; fermenting the product followed by a first ultrafiltering of the fermented material and separating bitter peptides therefrom, and a second ultrafiltering for separating lecithin and pasteurizing the ultrafiltrate material; diversifying the product, by fermenting it with different fermenting materials, said fermenting materials being selected depending on the desired end product; and concentrating, at a low temperature and under a high vacuum, the product obtained from the preceding steps.</p>		

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Description

METHOD FOR MAKING SOY EXTRACTS

BACKGROUND OF THE INVENTION

The present invention relates to a method for making soya extracts.

More specifically, the present invention
5 relates to a method allowing to make a concentrated soluble soya seed extract, having a light cream perfume, a neutral taste and devoid of any aftertastes.

As is known, an adult person must have a
10 blood cholesterol rate within 200 mg/dl, for preventing infarcts and cardiovascular diseases.

Actually, scientific searches, carried out through the overall world, have demonstrated that by reducing the average cholesterol rates of a 1%
15 population, a decrease of the infarct mortality rate of about 2% is obtained.

A consolidated scientific literature has demonstrated that a soya based feeding would reduce the excess cholesterol by 50-60% without any
20 contraindications.

Accordingly, it would be very advantageous, from an adult person and child standpoint, to add to frequently used food such as creams, salamis, cheese, yoghurt, butter, cakes and the like as well as child
25 snacks, ravioli and tortellini, cannelloni and pizzas, hamburgers and meat based product in general, as well as chocolates based products and many other gastronomic products usually containing great amounts

of unsaturated fat acids and cholesterol, a vegetable product, such as soya, which is a very efficient natural anticholesterol material.

In order to meet the above mentioned requirements, it has been already suggested to use, for said anticholesterol function, the soya milk, soya tofu as well as several types of soya proteins; however, these soya based materials would be unsuitable since these products are characterized by a strong aftertaste similar to that of an uncooked bean which would be inevitably transmitted to the product to which such an anticholesterol material would be added.

15 SUMMARY OF THE INVENTION

Accordingly, the aim of the present invention is to provide a method for making soluble concentrated soya extracts, having a light cream perfume, and a neutral taste, free of any aftertastes, thereby allowing said concentrated soya extracts to be added to a lot of high cholesterol contents food materials such as creams, cooked salamis, cooked ham, Parma ham, cheese, yoghurt, butter, fresh and dried pastas, ravioli and tortellini, cannelloni and pizzas, hamburgers and meat based products in general, as well as chocolate based products and many other gastronomic products, without modifying the natural taste of these products.

30 Within the scope of the above mentioned aim, a main object of the present invention is to provide such a method specifically designed for

making a concentrated soya extract having a light cream perfume, a neutral taste, devoid of any aftertastes, holding intact the health properties of the soya material, and without the need of performing
5 complex processing steps.

Another object of the present invention is to provide such a method which is very reliable and safe in operation.

According to one aspect of the present
10 invention, the above mentioned aim and objects, as well as yet other objects, which will become more apparent hereinafter, are achieved by a method for making water soluble soya extracts, characterized in that said method provides for subjecting soya seeds
15 to the following operating steps:

A) hulling of the soya seeds; B) softening in water the hulled soya seeds and boiling and crushing said seeds; C) centrifuging the seed mass thereby separating a filtrate and a solid panel therefrom; D)
20 fermenting the product followed by a first ultrafiltering of the fermented material, separating the bitter peptides therefrom, and further followed by a second ultrafiltering step for separating lecithin, and pasteurizing the ultrafiltered
25 material; E) diversifying the obtained product by fermenting it with different fermenting materials, suitably selected depending on the end desired product; F) concentrating, under low temperature and high vacuum conditions, the product obtained by the
30 preceding operating steps.

According to a preferred embodiment of the present invention, the product diversifying step is

carried out by fermenting said product by using Streptococcus lactis and Streptococcus thermophilus for 35 minutes at 34°C, with a grafting of 20% of lean milk in order to favour the fermenting of said product.

According to another preferred embodiment of the present invention, the product diversifying step is carried out by fermenting, with a recovery of lecithin, by Streptococcus reffinolactis at 30°C for 45 minutes to provide a soya extract adapted to be mixed with a soft or hard wheat meal, to provide pastas either of the fresh or of a dried type.

According to a further preferred embodiment of the present invention, the product diversifying step is carried out by fermenting the product by Streptococcus thermophilus at 40°C for 45 minutes to provide a natural soya yoghurt.

According to yet another preferred embodiment of the present invention, the product diversifying step is performed by fermenting the product by acid-lactic Pediococcus at 40°C for 45 minutes to provide a filtrate suitable for mixing with a fresh salami mixture to provide aged salami products.

According to yet another preferred embodiment of the present invention, said product diversifying step is carried out by fermenting the product by Lactobacillus fermentum at 37°C for 25 minutes to provide an extract to be mixed with a fresh "mortadella" paste, to provide a mortadella like product, or with meat for cooked jam, to provide a cooked jam-like product.

DETAILED DESCRIPTION OF THE INVENTION

Further advantages and characteristics of the present invention will become more apparent thereafter from the following detailed description of a preferred embodiment of the method according to the invention, given by way of a not limitative example of several possible variations of the invention.

The method for making a concentrated soya extract, having a light cream perfume, and a neutral taste devoid of any aftertastes, according to the present invention, comprises a first step in which the soya seed material is loaded in a suitable volume silo, where the soya seeds, in particular yellow soya (Glycine Hispida) seeds are hulled by a continuously operating hully device, with the simultaneous emptying of the silo.

A satisfactory hulling system would provide a soya seed hulling rate of about 8,000 kg of soya seeds in 4 working hours by 4 operators.

The soya seed hulling step is preferably carried out in a stainless steel 316 hulling device operating at room temperature; in this connection it should be pointed out that the soya seed hulling would also facilitate the softening and boiling of the hulled soya seeds, for removing therefrom any antitripsine factors.

The second operating step comprises the softening, boiling and crushing of the hulled soya seeds.

The softening time, in particular, will be of 10-12 hours in water at 4°C and it will vary

depending on the ageing degree of the soya seeds and their source, whereas the cooking will be performed at 110°C in a pressurized reactor for 15 minutes.

Then, the thus processed soya seed mass
5 will be cooled by causing icy water to pass through the reactor gap to provide a temperature of about 30°C, as required for the third operating or processing step.

More specifically, for processing a feeding
10 amount of 8,000 kg of dry soya seeds, the soya seed and necessary water loading time will be of 2 hours, while using 4 workers.

The third operating or processing step, in particular, comprises a centrifuging of the "mass"
15 coming from a drying and powdering step in a conical mill oven in which operation the centrifuging apparatus waste, rich in fibers and particularly suitable for backed product will be also processed.

The centrifuging of a "mass" of about
20 64,000 liters will be performed in a period of about 6 hours. The filtrate material will correspond to 60,000 liters, whereas the centrifuging step (wet) material will correspond to about 4,000 kg.

The fourth processing or operating step
25 would comprise a first fermenting step at 30°C by using *Aspergillus oryzae* for 240 minutes, and ultrafiltering, at a preset cut-off the fermented product in order to remove some bitter peptides therefrom, and pasteurizing the ultrafiltered or
30 ultrafiltrated material at 60°C for 60 minutes and cooling at a temperature deemed necessary for one of the different possible fermentations.

In this step two workers would be used, for the product amounts thereinabove indicated.

The fifth operating or processing step would be a diversifying step specifically provided
5 for diversifying the end extract product thereby making it suitable for use to provide a lot of different finished or end products.

This step, in particular, comprises a fermenting operation which can be carried out by
10 using different fermenting substances, depending on the use of the end extract.

For example, as stated, if the made extract must be mixed with a partially skimmed milk to provide a "crescenza"-like cheese, then the
15 fermenting step will be carried out by using *Streptococcus lactis* and *Streptococcus thermophilus* at 34°C, while adding to the extract 20% of lean milk in order to favor the fermentation thereof.

The other above mentioned fermenting
20 substances, as used in different proportions and combinations, will provide extracts which, upon concentrating, can be used for making any types of cheese, uncooked and cooked salamis, fresh and dried pastas, ice creams, cakes and the like, creams and
25 saucers, chocolate based products, thereby each type of fermenting would provide a different type of end product.

More specifically, the following examples are hereinbelow considered:

30 fermenting, while recovering lecithin, by using *Streptococcus raffinolactis* at 30°C for 45 minutes to provide a soya extract suitable for mixing with soft

and hard wheat meal to provide fresh or dried pastas.

Fermenting by *Streptococcus thermophilus* at 40°C for 45 minutes to provide natural soya yoghurts.

Fermenting by acid-lactic *Pediococcus* at
5 40°C for 45 minutes to provide a filtrate adapted for
mixing with a fresh salami paste, to provide aged
salamis.

Fermenting by *Lactobacillus fermentum* at
37°C for 25 minutes to provide an extract to be mixed
10 with a fresh mortadella paste to provide a
mortadella-like product, or with meat to provide a
cooked jam-like product.

The sixth operating or processing step
comprises a low temperature and high vacuum
15 concentration which would vary depending on each
different types of concentrated extracts to be made.

The concentrating time will vary from two
to six hours, by using two workers.

The seventh operating or processing step
20 comprises a spray drier processing, necessary for
making some products such as uncooked salamis,
chocolate and the like.

The soya extract made by the above
disclosed method has the great advantage that it is
25 very soluble, as a light cream perfume, a neutral
taste devoid of any aftertaste, thereby it can be
easily hot and cold amalgamated or mixed with
products such as butter, curd cream, salamis, cooked
jam, yoghurt, milk and milk cream, pizza paste, fresh
30 and dried pastas, cakes and pastries, tortellini and
ravioli, hamburgers and so on.

Thus, the above mentioned food products

will be provided with the valuable and delicate organoleptic characteristics of the above disclosed concentrate filtrate, with its health properties, typical of the soya, with a great reduction, in the
5 end products, of the saturated fats and cholesterol, up to 80-90% of the starting product, without any taste difference from a conventional like food product.

From the above disclosure it should be
10 apparent that the invention fully achieves the intended aim and objects.

In particular, a method has been provided allowing to make a soluble product, devoid of any aftertaste and of neutral taste, having a pleasant
15 cream perfume, which can be easily mixed with the most part of food products.

While the method of the invention has been disclosed and illustrated with reference to preferred embodiments thereof, it should be apparent that the
20 disclosed embodiments are susceptible to several modifications and variations all of which will come within the spirit and scope of the invention as defined in the appended claims.

CLAIMS

1. A method for making water soluble soya extracts, characterized in that said method provides
5 for subjecting soya seeds to the following operating steps:

A) hulling of the soya seeds; B) softening in water the hulled soya seeds and boiling and crushing said seeds; C) centrifuging the seed mass thereby
10 separating a filtrate and a solid panel therefrom; D) fermenting the product followed by a first ultrafiltering of the fermented material, separating the bitter peptides therefrom, and further followed by a second ultrafiltering step for separating
15 lecithin, and pasteurizing the ultrafiltered material; E) diversifying the obtained product by fermenting it with different fermenting materials, suitably selected depending on the end desired product; F) concentrating, under low temperature and
20 high vacuum conditions, the product obtained by the preceding operating steps.

2. A method for making soya extracts, according to Claim 1, characterized in that said hulling step is carried out in a stainless steel 316
25 hulling device operating at room temperature.

3. A method for making soya extracts, according to Claims 1 and 2, characterized in that said soya seed softening step B) is carried out by supplying to an autoclave distilled water at 4°C for
30 a time from 10 to 12 hours, and bringing the obtained mixture to boiling at 110°C for 15 minutes.

4. A method for making soya extracts, according to one or more of the preceding claims, characterized in that said centrifuging step is carried out for centrifuging the water mixture after a suitable cooling thereof.

5. A method for making soya extracts, according to one or more of the preceding claims, characterized in that said step D) comprises a first fermenting at 30°C by *Aspergillus oryzae* for 240 minutes, a ultrafiltering of the fermented product, to remove some bitter peptides therefrom, a pasteurizing of the ultrafiltered material and a cooling to a temperature necessary for one of several possible fermentations.

6. A method for making soya extracts, according to Claim 5, characterized in that said ultrafiltering step is carried out by ultrafiltering at a preset cut-off with a separation of some bitter peptides.

7. A method for making soya extracts, according to Claim 5 or 6, characterized in that said ultrafiltered product pasteurizing step is carried out at 60°C for 60 minutes.

8. A method for making soya extracts, according to one or more of Claims 1 to 7, characterized in that said product diversifying step is carried out by fermenting said product by *Streptococcus lactis* and *Streptococcus thermophilus* for 35 minutes to provide a soya extract to be mixed with lean milk to provide a cheese-like product.

9. A method for making soya extracts, according to Claim 8, characterized in that said

fermenting by *Streptococcus lactis* and *Streptococcus thermophilus* is carried out at 34°C with an addition of 20% lean milk to promote said fermenting.

10. A method for making soya extracts,
5 according to one or more of Claims 1 to 7, characterized in that said product diversifying step is carried out by fermenting, with a recovery of lecithin, by *Streptococcus raffinolactis* at 30°C for 45 minutes to provide a soya extract suitable for
10 mixing with a soft or hard wheat meal to provide fresh or dried pastas.

11. A method for making soya extracts, according to one or more of Claims 1 to 7, characterized in that said product diversifying step
15 is carried out by fermenting by *Streptococcus thermophilus* at 40°C for 45 minutes to provide natural soya yoghurt.

12. A method for making soya extracts, according to one or more of Claims 1 to 7,
20 characterized in that said product diversifying step is carried out by fermenting by acid-lactic *Pediococcus* at 40°C for 45 minutes to provide a filtrate suitable for mixing with a fresh salami paste to provide aged salamis.

13. A method for making soya extracts,
25 according to one or more of Claims 1 to 7, characterized in that said product diversifying step is carried out by fermenting by *Lactobacillus fermentum* at 37°C for 25 minutes to provide an
30 extract suitable for mixing with a fresh mortadella paste to provide a mortadella-like food product, or with cooked jam meat to provide a cooked jam like

food product.

14. A method for making soya extracts,
according to one or more of the preceding claims,
characterized in that said method comprises a further
5 spray dryer processing step.

15. A soya extracts made by a method
according to one or more of the preceding claims.

INTERNATIONAL SEARCH REPORT

International Application No

PCT/IT 99/00301

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 A23L1/20 A23J1/14 A23C20/02

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 A23L A23J A23C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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NL - 2280 HV Rijswijk
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Fax: (+31-70) 340-3016

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Caturla Vicente, V

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